AMENDMENTS TO THE DRAWINGS

Attached drawing sheets 1/24 through 24/24 (see Appendix A) include the label "REPLACEMENT SHEET" in the top right corner. These sheets replace drawing sheets 1/24 through 24/24, filed on June 11, 2007.

REMARKS/ARGUMENT

Claims 1, 3-71, 75-83, 85-87, 89-93, and 95-122 remain pending for further prosecution. Claims 1, 13, 26, 32-34, 102-111, 115, and 117 have been amended. Claims 82, 92, and 122 have also been amended to correct minor informalities. Claims 2, 72-74, 84, 88, and 94 have been cancelled.

Support for the claim amendments can be found, for example, in FIGS. 1, 2, 7, 22, 23, 30, 34, and 35, and pages 10-15, 16-18, 38, 39, 56-60, and 67-73 of the originally filed specification. No new matter has been added.

Corrected Drawings

Replacement drawing sheets 1/24 through 24/24 are submitted herewith to replace the drawings filed on June 11, 2007. No new matter has been added.

Objection to Claims 32 and 33

Claims 32 and 33 were objected to for minor grammatical informalities. Claims 32 and 33 and have been amended to recite "said plurality of physical systems". For at least these reasons, the objection should be withdrawn.

Obviousness Rejection of Claims 1, 3-71, 75-83, 85-87, 89-93, and 95-122 Based on Watts in view of Sagawa

Claims 1, 3-71, 75-83, 85-87, 89-93, and 95-122 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Watts US 6,810,370 ("Watts") in view of Sagawa US 5,408,638. These rejections are respectfully traversed.

The system disclosed in Watts differs from the claimed invention as described below. Watts describes a method for simulating a physical system numerically represented by partial differential equations. (See column 4, lines 28-30). Watts is described as being "particularly useful in simulating a characteristic of a physical system in which a transport phenomena is occurring" such as momentum transport, energy transport, and mass transport. (See column 4, lines 36-42). Watts further discloses that its invention can be applied to different areas such as physics, rock characterization, crystallography, electrical engineering, biology, mathematics, fluid mechanics, and petroleum engineering. (See column 4, lines 43-45). While Watts

apparently discloses predicting a property of a physical system and a transport phenomena occurring in it as a function of time (*see* column 12, line 67 to column 13, line 2), it is noteworthy that Watts **fails** to disclose, teach, or suggest producing a model of a <u>combined system</u> by representing physical quantities of the combined system in terms of a <u>combined set of partial differential equations</u> for <u>two or more selected application modes</u>.

Sagawa is alleged in the Office action to teach the displaying of a model using differential equations. (Office action, p. 7). However, the citations to Sagawa do not overcome the deficiencies of Watts that are discussed above.

In addition, the Office action states that the term "application modes" as recited in independent claim 1, 42, 82, 92, 116, 117, 119, 121, and 122 is interpreted to mean "different types of phenomena [that] can be modeled using the claimed partial differential equations. (*See* Office action, p. 6). That is, the Office action appears to be saying that the term "application mode" is analogous to the areas of application (e.g., momentum transport, energy transport) disclosed in Watts. However, this interpretation is inconsistent with the Applicants' specification.

<u>Independent Claim 1</u>

Amended independent claim 1 recites, *inter alia*, a method executed in a computer system with at least one physical computing device for producing a model of a combined physical system having physical quantities by representing physical quantities of the combined physical system in terms of a combined set of partial differential equations, the method comprising: (i) representing at least one of a <u>plurality of physical systems</u> as <u>two or more selected application modes</u> modeling physical quantities of the at least one of the plurality of physical systems; and (ii) outputting to a display device or a communication device the model of the <u>combined physical system</u> based on the <u>combined set of partial differential equations</u> for the two or more selected application modes for the one of the plurality of physical systems.

As discussed above, Watts describes a method for simulating a physical system which is numerically represented by partial differential equations. (*See* column 4, lines 28-30). That is, Watts's disclosure appears limited to a single physical system. In contrast, claim 1 recites a

model of a <u>combined physical system</u> based on a <u>combined set of partial differential equations</u>. Furthermore, Watts describes "simulating a characteristic of a physical system." (*See* column 4, lines 36-42). That is, Watts's disclosure appears limit to a single characteristic of a physical system. In contrast, claim 1 also recites representing at least one of a plurality of physical systems as <u>two or more</u> selected application modes modeling physical quantities of the physical systems. Thus, Watts fails to disclose, teach, or suggest a model of a combined physical system based on a combined set of partial differential equations for two or more application modes for one of a plurality of systems, as generally recited in amended claim 1. The citations to Sagawa do not overcome the deficiencies of Watts.

Applicants submit that the citations to Watts, Sagawa, or any combination thereof, do not, and cannot, render obvious independent claim 1. Since all the elements of independent claim 1 cannot be found in Watts, a *prima facie* case of obviousness has not been established. For at least these reasons, the rejection of claim 1 should be withdrawn, and furthermore, the claim should be allowed.

<u>Dependent Claims 3-41 and 102-110</u>

Claims 3-41 and 102-110 depend either directly or indirectly from independent claim 1. As discussed above, Watts in view of Sagawa does not disclose or suggest all the elements of independent claim 1. Furthermore, Watts fails to disclose or suggest certain elements recited directly in the dependent claims. For example, the Office action improperly relies on Watts, column 12, lines 5-24 as teaching claim 15. (*See* Office action, ¶ 7.18). However, the citation to Watts merely teaches a standard numerical method for improving convergence, which is different from the recitation in claim 15 of solving a combined set of partial differential equations using a coefficient form of the combined set of partial differential equations.

As another example, the Office action acknowledges that Watts does not disclose "defining a user-defined application mode", as recited in dependent claim 35. The Office action improperly relies upon FIGS. 21-24 of Sagawa and the descriptive text of these figures as allegedly overcoming the deficiencies of Watts. (*See* Office action, ¶ 7.18). However, Watts in view of Sagawa does not disclose defining a user-defined application mode. While Sagawa discloses a user defining a region and the inputting of a shape using interface window 1101 (*see*

FIGS. 21-24; column 9, lines 44-59), it only appears to disclose a list of physical phenomena such as heat, fluid, magnetic, and structure. That is, the physical phenomena disclosed in Sagawa are not user-defined, but rather, are pre-defined.

For at least these reasons, the citations to Watts, Sagawa, or any combination thereof, do not and cannot disclose or suggest dependent claims 3-41 and 102-110.

<u>Independent Claim 42</u>

Independent claim 42 recites, *inter alia*, an apparatus including a computer comprising a processor, a user input device, a display device, and a memory device, the memory device containing executable instructions for producing a model of a combined physical system having physical quantities by representing physical quantities of the combined physical system in terms of a combined set of partial differential equations, the executable instructions causing the processor to perform, upon execution, acts comprising (i) representing in up to three space dimensions at least one of a <u>plurality of systems</u> as <u>two or more selected application modes</u> modeling physical quantities of one of the plurality of systems; and (ii) outputting the model of the <u>combined physical system</u> to the display device or a communication device, the model based on the <u>combined set of partial differential equations</u> for the two or more selected application modes for the one of the plurality of systems.

As discussed for claim 1, Watts's disclosure appears limited to a single physical system. In contrast, claim 42 recites a model of a <u>combined physical system</u>, the based on a <u>combined set of partial differential equations</u>. Furthermore, Watts's disclosure appears limit to a single characteristic of a physical system. In contrast, claim 42 also recites representing at least one of a plurality of systems as <u>two or more</u> selected application modes modeling physical quantities of the physical systems. That is, Watts **fails** to disclose, teach, or suggest a model of a combined physical system based on a combined set of partial differential equations for two or more application modes for one of a plurality of systems, as generally recited in amended claim 42. The citations to Sagawa do not overcome the deficiencies of Watts.

Applicants submit that the citations to Watts, Sagawa, or any combination thereof, do not, and cannot, render obvious independent claim 42. Since all the elements of independent

claim 42 cannot be found in Watts, a *prima facie* case of obviousness has not been established. For at least these reasons, the rejection of claim 42 should be withdrawn, and furthermore, the claim should be allowed.

Dependent Claims 43-71, 75-81, 111, and 112

Claims 43-71, 75-81, 111, and 112 depend either directly or indirectly from independent claim 1. As discussed above, Watts in view of Sagawa does not disclose or suggest all the elements of independent claim 42. Furthermore, Watts fails to disclose or suggest certain elements recited directly in the dependent claims. For example, the Office action acknowledges that Watts does not disclose "defining a user-defined application mode". The Office action improperly relies upon FIGS. 21-24 of Sagawa and the descriptive text of these figures as allegedly overcoming the deficiencies of Watts. (*See* Office action, ¶ 7.18). However, Watts in view of Sagawa does not disclose defining a user-defined application mode, as recited, for example, in claims 71 and 75. While Sagawa discloses a user defining a region and the inputting of a shape using interface window 1101 (*see* FIGS. 21-24; column 9, lines 44-59), it only appears to disclose a list of physical phenomena such as heat, fluid, magnetic, and structure. That is, the physical phenomena disclosed in Sagawa are not user-defined, but rather, are pre-defined. For at least these reasons, the citations to Watts, Sagawa, or any combination thereof, do not and cannot disclose or suggest dependent claims 43-71, 75-81, 111, and 112.

Independent Claim 82

Amended independent claim 82 recites, *inter alia*, a method executed in a computer system with at least one processor for producing a model of a combined physical system having physical quantities by representing physical quantities of the combined physical system in terms of a combined set of partial differential equations, the method comprising: (i) defining a plurality of user-defined application modes modeling physical quantities of an associated model having up to three space dimensions; (ii) selecting two or more of the user-defined application modes; (iii) determining sets of partial differential equations for the selected two or more user-defined application modes of the associated model; and (iv) outputting the model based on a combination of the determined sets of partial differential equations for the two or more selected user-defined application modes for the associated model.

As discussed for claims 1 and 42, Watts's disclosure appears limited to a single physical system. In contrast, claim 82 recites a model of a <u>combined physical system</u>, the model based on a <u>combination of determined sets of partial differential equations</u>. Furthermore, Watts's disclosure appears limit to a single characteristic of a physical system. In contrast, claim 82 also recites <u>two or more</u> selected user-defined application modes for an associated model. That is, Watts <u>fails</u> to disclose, teach, or suggest a model of a combined physical system in terms of a combined set of partial differential equations and two or more user-defined application modes, as generally recited in amended claim 82. The citations to Sagawa do not overcome the deficiencies of Watts.

Furthermore, Watts in view of Sagawa does not disclose a user-defined application mode. While Sagawa discloses a user defining a region and the inputting of a shape using interface window 1101 (*see* FIGS. 21-24; column 9, lines 44-59), it only appears to disclose a list of physical phenomena such as heat, fluid, magnetic, and structure. That is, the physical phenomena disclosed in Sagawa are not user-defined, but rather, are pre-defined.

Applicants submit that the citations to Watts, Sagawa, or any combination thereof, do not, and cannot, render obvious independent claim 82. Since all the elements of independent claim 82 cannot be found in Watts, a *prima facie* case of obviousness has not been established. For at least these reasons, the rejection of claim 82 should be withdrawn, and furthermore, the claim should be allowed.

Dependent Claims 83, 85-87, 89-91, and 113

Claims 83, 85-87, 89-91, and 113 depend either directly or indirectly from independent claim 82. As discussed above, Watts in view of Sagawa does not disclose or suggest all the elements of independent claim 82. For at least this reason, the citations to Watts, Sagawa, or any combination thereof, do not and cannot disclose or suggest dependent claims 83, 85-87, 89-91, and 113.

Independent Claim 92

Independent claim 92 recites, *inter alia*, an apparatus including a computer system comprising a processor, a user input device, a display device, and a memory device, the memory device containing executable instructions for producing a model of a combined physical system

having physical quantities by representing physical quantities of the <u>combined physical system</u> in terms of a combined set of partial differential equations, the executable instructions causing the processor to perform, upon execution, acts comprising (i) defining a plurality of user-defined application modes modeling physical quantities of an associated model; (ii) selecting two or more of the user-defined application modes; (iii) determining sets of partial differential equations for the selected two or more user-defined application modes of the associated model; and (iv) outputting the model based on a <u>combination of the determined sets of partial differential equations</u> for the <u>two or more selected user-defined application modes</u> for the associated model.

As discussed for claims 1, 42, and 82, Watts's disclosure appears limited to a single physical system. In contrast, claim 92 recites a model of a <u>combined physical system</u>, the model based on a <u>combination of determined sets of partial differential equations</u>. Furthermore, Watts's disclosure appears limit to a single characteristic of a physical system. In contrast, claim 92 also recites <u>two or more</u> selected user-defined application modes for an associated model. That is, Watts <u>**fails**</u> to disclose, teach, or suggest a model of a combined physical system in terms of a combined set of partial differential equations and two or more user-defined application modes, as generally recited in amended claim 92. The citations to Sagawa do not overcome the deficiencies of Watts.

Furthermore, Watts in view of Sagawa does not disclose a user-defined application mode. While Sagawa discloses a user defining a region and the inputting of a shape using interface window 1101 (*see* FIGS. 21-24; column 9, lines 44-59), it only appears to disclose a list of physical phenomena such as heat, fluid, magnetic, and structure. That is, the physical phenomena disclosed in Sagawa are not user-defined, but rather, are pre-defined.

Applicants submit that the citations to Watts, Sagawa, or any combination thereof, do not, and cannot, render obvious independent claim 92. Since all the elements of independent claim 92 cannot be found in Watts, a *prima facie* case of obviousness has not been established. For at least these reasons, the rejection of claim 92 should be withdrawn, and furthermore, the claim should be allowed.

Dependent Claims 93, 95-101, 114, and 115

Claims 93, 95-101, 114, and 115 depend either directly or indirectly from independent claim 92. As discussed above, Watts in view of Sagawa does not disclose or suggest all the elements of independent claim 92. For at least this reason, the citations to Watts, Sagawa, or any combination thereof, do not and cannot disclose or suggest dependent claims 93, 95-101, 114, and 115.

Independent Claims 116 and 117

Independent claims 116 and 117 generally recite, *inter alia*, methods executed in a computer system with at least one physical computing device for producing a model of a combined physical system having physical quantities by representing physical quantities of the combined physical system in terms of a combined set of partial differential equations, the methods comprising: (i) representing at least one of a plurality of systems as two or more selected application modes modeling physical quantities of the at least one of the plurality of physical systems; and (ii) outputting the model of the combined physical system based on the combined set of partial differential equations for the two or more selected application modes for the one of the plurality of physical systems.

As discussed for claims 1, 42, 82, and 92, Watts's disclosure appears limited to a single physical system. In contrast, claims 116 and 177 recite a model of a combined physical system, the model based on a combination of determined sets of partial differential equations. Furthermore, Watts's disclosure appears limit to a single characteristic of a physical system. In contrast, claims 116 and 117 also recite two or more selected user-defined application modes for an associated model. That is, Watts **fails** to disclose, teach, or suggest a model of a combined physical system in terms of a combined set of partial differential equations and two or more user-defined application modes, as generally recited in claims 116 and 117. The citations to Sagawa do not overcome the deficiencies of Watts.

Applicants submit that the citations to Watts, Sagawa, or any combination thereof, do not, and cannot, render obvious independent claims 116 and 117. Since all the elements of independent claims 116 and 117 cannot be found in Watts, a *prima facie* case of obviousness has

not been established. For at least these reasons, the rejection of claims 116 and 117 should be withdrawn, and furthermore, the claim should be allowed.

<u>Independent Claim 118</u>

Independent claim 118 recites, *inter alia*, a method executed in a computer system with at least one physical computing device for producing a model of a combined physical system having physical quantities and a solution to the model, the method comprising: (i) representing the <u>combined physical system</u> by a geometry described by a mesh and a set of physical properties; (ii) providing a <u>plurality of application modes</u>; (iii) selecting at least a first and a second of the application modes; (iii) forming a <u>combined system of partial differential equations</u>; and (iv) generating a solution using the combined system of partial differential equations.

As discussed for claims 1, 42, 82, 92, 116, and 117, Watts's disclosure appears limited to a single physical system. In contrast, claim 118 recites producing a model of a <u>combined physical system</u> and forming a <u>combined system of partial differential equations</u>. Furthermore, Watts's disclosure appears limit to a single characteristic of a physical system. In contrast, claim 118 also recites <u>a plurality</u> of application modes. That is, Watts **fails** to disclose, teach, or suggest a model of a combined physical system, forming a combined set of partial differential equations, and a plurality of application modes, as generally recited in claim 118. The citations to Sagawa do not overcome the deficiencies of Watts.

Applicants submit that the citations to Watts, Sagawa, or any combination thereof, do not, and cannot, render obvious independent claim 118. Since all the elements of independent claim 118 cannot be found in Watts, a *prima facie* case of obviousness has not been established. For at least these reasons, the rejection of claim 118 should be withdrawn, and furthermore, the claim should be allowed.

<u>Dependent Claims 119 and 120</u>

Claims 119 and 120 depend from independent claim 118. As discussed above, Watts in view of Sagawa does not disclose or suggest all the elements of independent claim 118. For at least this reason, the citations to Watts, Sagawa, or any combination thereof, do not and cannot disclose or suggest dependent claims 119 and 120.

Independent Claim 121

Independent claim 121 recites, *inter alia*, an apparatus including a computer system comprising at least one processor, a user input device, a display device, and a memory device, the memory device containing executable instructions for producing a model of a combined fluids system having physical quantities by representing physical quantities of the <u>combined fluids system</u> in terms of a combined set of partial differential equations, the executable instructions causing the processor to perform, upon execution, acts comprising (i) representing the <u>combined fluids system</u> by a geometry described by a mesh and a set of physical properties; (ii) providing a <u>plurality of application modes</u>; (iii) selecting at least a first and a second of the application modes; (iii) forming a <u>combined system of partial differential equations</u>; and (iv) generating a solution using the combined system of partial differential equations.

As discussed for claims 1, 42, 82, 92, and 116-118, Watts's disclosure appears limited to a single physical system. In contrast, claim 121 recites producing a model of a <u>combined fluids system</u> and forming a <u>combined system of partial differential equations</u>. Furthermore, Watts's disclosure appears limit to a single characteristic of a physical system. In contrast, claim 121 also recites <u>a plurality</u> of application modes. That is, Watts **fails** to disclose, teach, or suggest a model of a combined fluids system, forming a combined set of partial differential equations, and a plurality of application modes, as generally recited in claim 121. The citations to Sagawa do not overcome the deficiencies of Watts.

Applicants submit that the citations to Watts, Sagawa, or any combination thereof, do not, and cannot, render obvious independent claim 121. Since all the elements of independent claim 121 cannot be found in Watts, a *prima facie* case of obviousness has not been established. For at least these reasons, the rejection of claim 121 should be withdrawn, and furthermore, the claim should be allowed.

Independent Claim 122

Independent claim 122 recites, *inter alia*, an apparatus including a physical computing system comprising a first processor and a second processor, a user input device, a display device, and a memory device, the memory device containing executable instructions for producing a model of a combined system having physical quantities by representing physical quantities of the

combined system in terms of a combined set of partial differential equations, the executable instructions causing the processor to perform, upon execution, acts comprising (i) representing the combined system by a geometry described by a mesh and a set of physical properties; (ii) providing a plurality of application modes; (iii) selecting at least a first and a second of the application modes; (iii) forming a combined system of partial differential equations; and (iv) generating a solution using the combined system of partial differential equations.

As discussed for claims 1, 42, 82, 92, 116-118, and 121, Watts's disclosure appears limited to a single physical system. In contrast, claim 122 recites producing a model of a combined system and forming a combined system of partial differential equations. Furthermore, Watts's disclosure appears limit to a single characteristic of a physical system. In contrast, claim 122 also recites a plurality of application modes. That is, Watts **fails** to disclose, teach, or suggest a model of a combined system, forming a combined set of partial differential equations, and a plurality of application modes, as generally recited in claim 122. The citations to Sagawa do not overcome the deficiencies of Watts.

Applicants submit that the citations to Watts, Sagawa, or any combination thereof, do not, and cannot, render obvious independent claim 122. Since all the elements of independent claim 122 cannot be found in Watts, a *prima facie* case of obviousness has not been established. For at least these reasons, the rejection of claim 122 should be withdrawn, and furthermore, the claim should be allowed.

CONCLUSION

Applicants submit that claims 1, 3-71, 75-83, 85-87, 89-93, and 95-122 are in condition for allowance and action toward that is respectfully requested. If there are any matters which may be resolved or clarified through a telephone interview, the Examiner is requested to contact the undersigned attorney at (312) 425-8552.

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It is believed that no additional fees are due; however, should any additional fees be required (except for payment of the issue fee) or credits be due, the Commissioner is authorized

to deduct the fees from or credit the overpayments to the Nixon Peabody Deposit Account No.

50-4181, Order No. 801939-000101.

Respectfully submitted,

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APPENDIX A

REPLACEMENT DRAWINGS